

Is there a dichotomy in the Dark Matter as well as in the Baryonic Matter properties of ellipticals?

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Abstract. We have found a correlation between the M/L global gradients and the structural parameters of the luminous components of a sample of 19 early-type galaxies. Such a correlation supports the hypothesis that there is a connection between the dark matter content and the evolution of the baryonic component in such systems.

1. Background and new evidence

There are several lines of evidence for a dichotomy in the properties of early-type galaxies: fainter systems have pointed (disky) isophotes and central power-law surface brightness profiles, while bright galaxies are boxy and show central cores (Nieto & Bender 1989, Faber et al. 1997). This dichotomy has been interpreted in an evolutionary framework: disky/faint systems have not experienced merger events in the recent past (Nieto & Bender 1989), or alternatively are remnants of gas-rich merging events (Faber et al. 1997), while bright/boxy systems are probable merger remnants (Nieto & Bender 1989, Faber et al. 1997). This scheme is supported by X-ray properties of early-types (Pellegrini (1999) showed that faint/disky/power-law early-type galaxies are also fainter in X-ray luminosity, while bright/boxy/core galaxies are X-ray bright) and GCs number densities (Kissler-Patig 1997). What then is the actual mechanism which has triggered the evolution of both the stellar and hot gas components in galaxies?

In Fig. 1 we plot the global M/L radial gradients, $\Delta\Gamma/\Delta R$ ($\Gamma = M/L_B$), based on planetary nebulae kinematics and long-slit spectroscopy archive data, as a function of the intrinsic absolute magnitude, the isophotal shape parameter a_4 , and the γ parameter, i.e. the slope of the surface brightness profile in the galaxy core ($\sim R^{-\gamma}$). Fig. 1 suggests a general regularity of the M/L gradients with respect to the structural parameters for the majority of the galaxies in the sample, except for a few cases (open symbols): these are noted in literature as interacting candidates since they show dynamical peculiarities suggesting they are not in equilibrium. If we exclude this subsample, with very steep “apparent” M/L gradients, we see that smaller gradients ($\Delta\Gamma_B/\Delta R \leq 0.8$) are found for systems with faint total magnitudes ($M_B > -20$), mostly disky ($100 \times a_4/a > 0.2$) and power-law ($\gamma > 0.15$), while bright/boxy/core galaxies show larger

